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REFLEX EFFECT OF CHOLINOMIMETIC SUBSTANCES
ON BLOOD VESSELS OF RABBIT'S EAR

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[Comment: The following is taken from a paper presented
 14 March 1952 at the 95th Meeting of the Section of Pharmacology,
 and Toxicology, Moscow Society of Physiologists, Biocnemists, and
 Pharmacologists.]

The role played by the vascular receptor apparatus in the mechanism of drug action was investigated. In view of the fact that the blood vessels of a rabbit's ear have a high sensitivity to impulses from the central nervous system, it was assumed that these blood vessels may also act as a sensitive reflexogenic zone. In the investigation, M. P. Nikolayev's method was used: perfusion of the blood vessels of an ear connected to the body by means of a nerve. Perfusion of the blood vessels of the ear with acetylcholine then brings about a reflex drop in the blood pressure, an increased frequency and volume of respiration, and contraction of the muscles of extremities. Prior anesthesia of the blood-vessel receptors with novocain eliminated the reflex actions produced by acetylcholine.

Furthermore, experiments were carried out with the aim of clarifying the effect exerted in connection with reflex reactions to acetylcholine by reactive groups (i. e., sulfhydryl groups) which are present in the proteins of vascular interoreceptors. After perfusion of the ear with a solution of mercuric chloride or of cadmium chloride in a dilution of 1:1,000, i.e., after chemical binding of the sulfhydryl groups of receptor elements, the reflex reactions to acetylcholine with respect to blood pressure, respiration, and skeletal musculature are absent. The reflex reactions of the organism are restored after the ear has been perfused with a solution of cysteine and the sulfhydryl groups have been thereby liberated. The sensitivity of the receptors to acetylcholine is also restored by guanidine or urea solutions.

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These experiments have demonstrated the presence of sensitive reflexogenic zones in the vessels of a rabbit's ear and the significance, for the functional activity of interoceptors, of complete retention of structure by proteins.

To clarify the afferent and efferent means of impulse transmission, experiments involving removal of the upper sympathetic ganglion and section of the vagus have been carried out. Experiments have also been conducted on atropinized animals. The reflex reaction to perfusion of the ear with acetylcholine was preserved after all these interferences. It was found to be absent only after section of the spinal cord below the medulla oblongata.

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